Heterogeneity of the structural relaxation of jammed state in particle-filled elastomers XIAORONG WANG, Bridgestone Americas, Center for Research and Technology, CHRISTOPHER ROBERTSON — The Payne effect is a low-strain hysteretic softening in particle-filled elastomers which we recognize as part of jamming physics [1-2]. We find that in particle-filled elastomers aging at a fixed oscillatory strain \( \gamma_a \) produces a spectral hole in the loss modulus vs strain spectrum which is localized near the aging strain [3]. Sequential aging at two strains reveals that when \( \gamma_{a1} > \gamma_{a2} \) the resulting dynamic spectra appear to be a combination of that aged at \( \gamma_{a1} \) and \( \gamma_{a2} \); whereas for \( \gamma_{a1} < \gamma_{a2} \), the resulting dynamic spectra only reflect the characteristic hole burning of the second strain after holding at \( \gamma_{a2} \).

This remarkable behavior of particle-filled elastomers suggests that structural relaxations in jammed state are heterogeneous and aging at a fixed strain \( \gamma_a \) only affects part of the relaxation spectra.